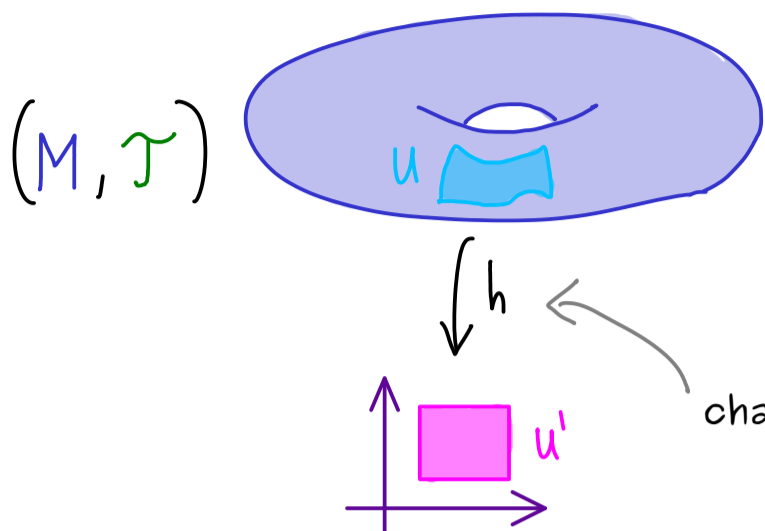


Manifolds - Part 10



(1) Hausdorff space

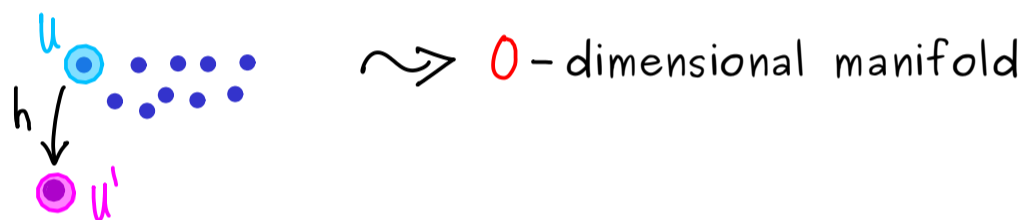
(2) second-countable

(3) locally Euclidean of dimension n

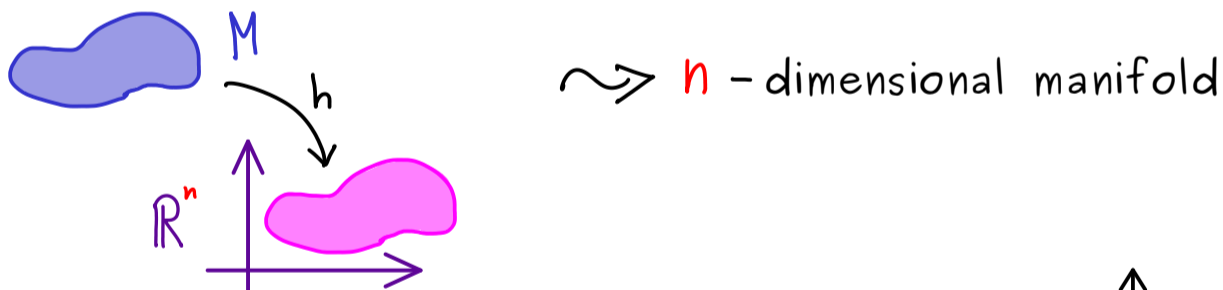
chart (U, h)

Definition: A collection of charts $(U_i, h_i)_{i \in I}$ is called an atlas if: $\bigcup_{i \in I} U_i = M$

Example: (a) (M, \mathcal{T}) discrete topological space with countably many points



(b) $M \subseteq \mathbb{R}^n$ open subset, (M, \mathcal{T}) with standard topology

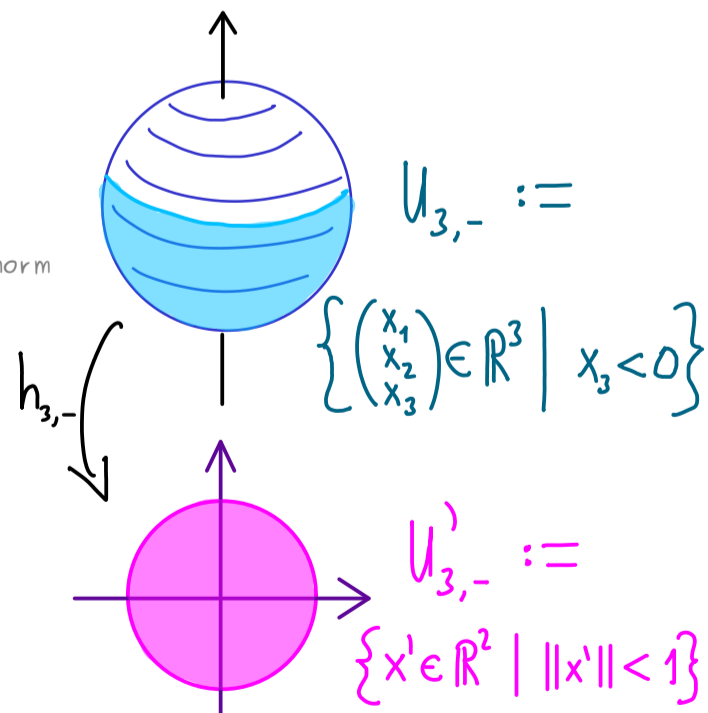


(c) $S^2 \subseteq \mathbb{R}^3$, $S^2 := \{x \in \mathbb{R}^3 \mid \|x\| = 1\}$

2-dimensional manifold

$$h_{3,-}: \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \mapsto \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$h_{3,-}^{-1}: \begin{pmatrix} x'_1 \\ x'_2 \end{pmatrix} \mapsto \begin{pmatrix} x'_1 \\ x'_2 \\ -\sqrt{1 - \|x'\|^2} \end{pmatrix}$$



$(U_{i,\pm}, h_{i,\pm})_{i \in \{1,2,3\}}$ is an atlas.